

Digitized by the Internet Archive
in 2009 with funding from
University of Toronto

RM
859
R313
v. 8
no. 2
c. 1
GERSTS

RADIUM

EDITED BY
CHARLES H. VIOL, Ph. D.
AND
WILLIAM H. CAMERON, M. D.

VOL. VIII

NOVEMBER, 1916

No. 2

CONTENTS

Radium Treatment of Uterine Cancers, Joseph
Ransohoff, M. D., and J. Louis Ransohoff,
M. D., 29

Radium in the Field of Laryngology, D. Bryson
Delavan, M. D., 33

REVIEWS AND ABSTRACTS.

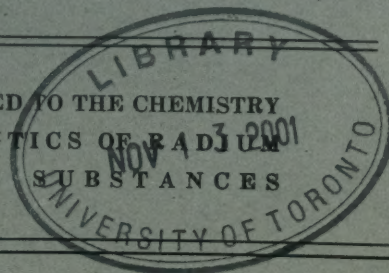
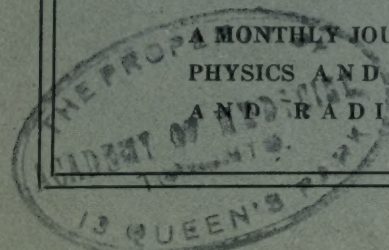
Henry Schmitz, M. D. The Action of Gamma Rays
of Radium on Deep-seated Inoperable Cancers
of the Pelvis, 37

Russell H. Boggs, M. D. The Treatment of Epithe-
lioma of the Lower Lip, 39

George Erety Shoemaker, M. D. Primary Carcinoma
of the Urethra, Retention of Urine from Obstruc-
tion, Restoration of Function by Radium, 42

J. Wesley Bovee, M. D. Notes on the Past, Present,
and Future of Gynecology, Obstetrics and Abdom-
inal Surgery, 44

A MONTHLY JOURNAL DEVOTED TO THE CHEMISTRY
PHYSICS AND THERAPEUTICS OF RADIUM
AND RADIO-ACTIVE SUBSTANCES



RADIUM

A MONTHLY JOURNAL DEVOTED TO THE CHEMISTRY, PHYSICS AND
THERAPEUTICS OF RADIUM AND RADIO-ACTIVE SUBSTANCES.

Edited and Published by Charles H. Viol, Ph. D., and William H. Cameron, M. D.
with the assistance of collaborators working in the fields of
Radiochemistry, Radioactivity and Radiumtherapy.

Subscription \$2.50 per year, or 25 cents per copy in the United States and Canada
in all other countries \$3.75 per year.

Address all communications to the Editors, Forbes and Meyran Avenues,
Pittsburgh, Pa.

VOL. VIII.

NOVEMBER, 1916

No. 2

RADIUM TREATMENT OF UTERINE CANCERS*

BY JOSEPH RANSOHOFF, M. D., F. R. C. S. (Eng.)

AND

J. LOUIS RANSOHOFF, M.D.,
CINCINNATI, OHIO.

The mortality of radical removal of the uterus for cancer, that of the body excepted, is so high and the end result so gloomy that we would all welcome a method of overcoming the disease, if without instituting a hazardous operation it would offer at least an equally good end-result. Whether radium treatment can do this, the next few years must determine.

Whatever else may be said of it, it does not immediately jeopardize life; it at least is safe. The discovery of the unique qualities of the ultra-penetrating gamma rays by Dominici marked an epoch in radium therapy. His principle of filtration permits the use of large quantities of radium without destructive effects on healthy tissues. It also permits the deep action of the rays without interfering with the viability of superficial tissues covering deep-seated lesions.

While it is not within the scope of this paper to discuss the scientific principles of radium therapy, a few words may not be out of place.

Numerous microscopic observations have shown that radium has a definite selective action on neoplastic tissue. For instance, a cancer of the uterus treated by radium shows definite histologic changes. During the first two weeks there is increase in size and vacuolization of the nuclei and numerous atypical mitoses are found. This is followed by

*Annals of Surgery, LXIV, pp. 298-303 Read before the American Surgical Association, May 10, 1916.

RADIUM

change in form, enlargement, and vacuolization of the cancer cells; retardation and finally cessation of nuclear division. The last stage is the destruction of the cell. This is accompanied by infiltration of leucocytes, the formation of new connective-tissue cells, and gradual replacement of neoplasm by fibrous tissue. There is always an obliteration of the blood-vessels, probably due to a proliferation of the intima. This in itself tends to the destruction of the highly organized neoplastic cells by interference with nutrition. It is one of the most potent factors in the radium cure of uterine fibroids. The metamorphosis of the cancer cells is always interesting, and at times unusual. Occasionally one may see in typical cancers of the cervix a tendency to cornification. In clinically cured cases of uterine cancer there are at times seen nests of changed, but undestroyed, cancer cells, imbedded in dense fibrous tissue. Whether or not these cells are capable of further growth and dissemination has not as yet been determined.

Whether the action of radium on neoplastic tissue is specific, or whether it is due to the great cell richness of the latter is merely an academic question. All things being equal, the action of radium on any tissue is in proportion to the abundance of nuclei. This has been well shown by Keetman and Harting,⁴ who have shown that radium depends for its action on the denser substances in the nuclei of the cells. For this reason, the more closely the tissue approaches the embryonal type, the more amenable it will be to the radium treatment. This accounts for the remarkable results achieved in the treatment of lymphosarcoma. Also, the comparative obstinacy of periosteal and chondrosarcoma to radium action.

The uterus presents an unusually fertile field for radium therapy, partly from the histologic structure of uterine cancer, but particularly because of its unusual accessibility. The radium can be brought into immediate contact with the neoplastic tissue where it can exert its direct influence. The primary results of radium therapy in this field have even exceeded the hopes of a few years ago. The reports grow more and more encouraging.

According to the report of the London Radium Institute, of 1914, uterine cancers yield most gratifying results, and the effect of radium in operable cancers is far in advance of those obtained by any known surgical or medical treatment.

Degrais² has a number of cases apparently well after four and five years, Rubens Duval,³ in a report of five years' experience, recounts a most interesting case of inoperable cancer of the uterus, which died of some intercurrent affection several years after radium therapy. Autopsy showed a complete anatomical cure. Of 158 cases reported, radium had a beneficial action in 155. In 93 the improvement was classed as phenomenal, while in 46 there was a probable cure.

Degrais and Belot have seen no case of cancer of the uterus in which some benefit has not been given by radium therapy. The question of the entire replacement of radical operation by radium therapy may soon come up for final solution.

The mortality of the Wertheim operation is from 15 to 25 per cent. in the hands of the best operators, and far greater in those of the average surgeon, and the percentage of cases which are in condition to undergo this operation is not very large. Probably the greater number of those

who undergo the Wertheim operation suffer from recurrence within the first year after operation. Many operators have taken the mid-ground in the treatment of operable cancers of the uterus. For instance, Pozzi⁵ has given up the extensive Wertheim operation, even in border-line cases, and treats them with radium alone. In operable cases, a simple vaginal hysterectomy is done, followed by prophylactic radium application.

The consensus of opinion of all operators is that operation after radium therapy is exceedingly difficult. For instance, Kelly⁴ says in the conclusion of his article, "in border-line and inoperable cases we advise the use of radium, as operative measures are impossible in this group. If the growth disappears, it can only be determined whether or not hysterectomy is advisable by trying out both methods. This as yet has not been done in a sufficient number of cases to arrive at any definite conclusion. We do feel, however, that when clinical cures have occurred in operable cases, operations are probably best not carried out."

In a personal communication Kelly stated that inoperable and border-line cases clinically cured by radium should *not* be subjected to operation.

The reason for the difficulty of operation in cases after radiation is easily understood from the fact that there is a great deal of fibrous tissue deposited which makes clean dissection extremely difficult and dangerous.

We have recently seen a striking example of this diction. In September, 1915, we saw a woman, aged forty-three. Five years before, a supravaginal hysterectomy had been done for fibroid. In June, 1915, she began to pass clots of blood. There was a great deal of backache. Examination shows cervix fixed and occupied by hard cancerous nodules. There was a marked infiltration of the left broad ligament. Under radium treatment the mass melted away, the bleeding stopped, and the pains disappeared. In March, 1916, against our advice, a vaginal removal of the cervical stump was attempted. The operation was exceedingly difficult and incomplete. The specimen removed showed a great deal of fibrous tissue and some few nests of embedded cancer cells. From the time of operation the pains recurred and the wound did not heal. Manifestly, as we have stated before, anything like a complete operation is impossible after extensive radium treatment. Whether this condition would have remained permanently well is doubtful. Her condition, however, was certainly only made worse by operation.

The results of Kroenig and Doederlein⁵ are only too well known to require more than mention.

The immediate local results of radium are phenomenal. Within a week of the first application the hemorrhage is, as a rule, arrested and the foul discharge stopped. We have not had a case in which we were not enabled to arrest both the offensive discharge and the hemorrhage within from one to three weeks. The cauliflower vegetations which frequently fill the vagina seem to melt away. The improvement of the general condition of the patient is astounding. Pain is sometimes relieved within a few days of the first application. The most difficult cases in which to effect a benefit are those which recur after a Wertheim operation. The fibrous tissue scars are so dense as to seem almost impervious to radiation. However, even these cases can be benefited, but we have no cure lasting more than a year. The pain in these cases is more difficult

to relieve than in those that are primary. The tissues are dry and densely infiltrated with scar tissue.

Out of 25 cases treated in this series, 11 are still well. Of these 3 have been well for two years, 6 from one to two years, and 2 from six months to a year. Of the 11 clinical recoveries, there were 3 operable and 8 inoperable. Of the 3 operable cases one is well after two years, and 2 over one year. Though the cases are few, this is in itself an interesting observation, as a recurrence after operation usually occurs within the first six months.

A few of the results obtained seem to warrant individual report.

CASE I.—Mrs. S., aged forty-five, was brought to the Jewish Hospital in an ambulance, in what seemed to be the last stage of a secondary anæmia. Red count 2,400,000, marked pœcilocytosis, hæmoglobin 40 per cent., weight 72 pounds. The vagina was completely blocked by exuberant masses springing from the cervix. There was, however, no involvement of the vesicovaginal or rectovaginal septum. March 15, 1915, contrary to our usual custom, in order to more promptly control the hemorrhage, the mass was curetted away, and cauterized with the actual cautery. One hundred milligrammes of radium were buried in the crater. On March 20, the hemorrhage was entirely stopped. Radium treatment was repeated four times between that and May 17. After the last treatment there was some rectal irritation. She was sent home and told to return for treatment in about two months. Nothing more was heard from her until April, of this year, when, in answer to inquiry, she stated she was in excellent health, weighed 110 pounds, normal weight 125, and that she did her own housework. Aside from a slight rectal irritation she was in excellent health. She has been perfectly well for over a year.

In all of these cases classed as inoperable, the uterus was firmly fixed in the pelvis, and there was marked hemorrhage and more or less putrid discharge. In all of these cases one of the most noticeable phenomena was the increased mobility of the uterus after the first few treatments. After more extensive radiation, the uterus again becomes more or less fixed by the new-formed fibrous tissue.

In one case we have had a recovery after a comparative incomplete series of treatment.

CASE II.—Mrs. H., aged seventy-one, seen first May 1, 1915. Has had slight hemorrhage from the uterus for a year and a half. For the past seven months very severe. Examination shows a carcinomatous degeneration of the entire cervix, with complete fixation of the uterus. Four treatments were given in all, and at the end of that time the cervix was normal and uterus movable. The patient refused further treatment. She is still well, although more than a year has passed since the last treatment.

In our experience there has been no single case in which the radium treatment was not followed by some benefit. One of our earliest cases came into the hospital in what seemed the last stages of septic infection. The vagina was filled with great masses of carcinomatous tissue, and the odor of the discharge was terrifying. After three radium applications of 24 hours each, the discharge stopped, the foul odor disappeared and the patient began to gain in weight. She died five months later of a large perinephric abscess, but there was no return of the vaginal involvement.

Cases approaching this in severity are numerous in our series, and

show that practically no case is too far advanced to be at least temporarily helped by radium treatment. In cases where there is involvement of the recto- and vesicovaginal septa great care must be exercised because of the danger of fistula formation.

Parenthetically we may here allude to an unpleasant sequel of radium therapy which we have seen in a few of our clinically cured cases. It is a pain in the rectum which occasionally becomes quite severe. It probably results from scar tissue, but this, it must candidly be said, is only a surmise.

There are, of course, many methods of applying radium to cancers of the uterus, according to the contour of the growth. We vary our methods, using for this purpose either a disc-like brass filter or one cylindrical in shape. The former is reserved for cases in which there is a broad ulcerating surface, and the latter for those in which there is a disposition to crater form.

SUMMARY.

1. Radium is the method of choice in the treatment of inoperable and border-line cases.

2. Of the three operable cases treated with radium a clinical cure has been effected in each case.

3. Cases clinically cured by radium should not be subjected to hysterectomy, as the operation is difficult and dangerous.

BIBLIOGRAPHY.

¹Keetman and Harting: Berl. Wochr., 1913, vol. xxxix, p. 1806.

²Degrais, P.: Ann. de Gynecol. et d' Obst., 1915, Wid. xi, p. 609.

³Duval, Rubens: Strahlentherap, 1914, vol. i.

⁴Kelly: Jour. Amer. Med. Assn., 1915, vol. lxy, p. 1874.

⁵Kroenig: Deutsch. Med. Wochenschr., June 26, 1913.

RADIUM IN THE FIELD OF LARYNGOLOGY*

BY D. BRYSON DELAVAN, M. D.,

NEW YORK.

The past year has brought distinct advances in the knowledge of the use of radium, in no department with more encouraging results than in ours. Today many observers are studying its effects in an ever increasing variety of disorders, some of which are far beyond the limits of previous conjecture. Additions are being rapidly made to the number of conditions in which the treatment is effective, and substantial encouragement is being given to the hope that there has been found in radium a truly valuable therapeutic agent. Several of our institutions, notably the General Memorial Hospital, New York, have been fortunate in acquiring amounts of radium large enough to meet all of the probable demands of treatment, while those in whose hands it has been placed for

*Medical Record, XC, 50-52, July 8, 1916. Read before the American Laryngological Association at its thirty-eighth meeting, Washington, D. C., May 10, 1916.

RADIUM

administration are gaining experience in its application and learning how it may best be utilized and controlled.

Some contributions have been made to the literature of the subject in general, but in the department of the diseases of the upper air passages little has yet appeared. This is not surprising. The study of radium is in its infancy. Few investigators at present are ready to issue formal reports of their work, wisely refraining from announcing results until their deductions can be placed upon a stable basis of well proved fact. Any attempt to drag it before the medical public at the present time would be premature. What is needed is not publicity, but rather the development of scientifically proved data upon which, and only which, reliable reports of progress are possible. The securing of such data requires *long-continued and painstaking study of the action of radium, under conditions favorable for accurate observation, in the hands of men especially qualified for the work.* When these conditions have been fulfilled, and not until then, we may hope for the beginning of a literature at once valuable and instructive. Meanwhile, however, even the most conservative observers are willing to admit that encouraging progress is being made. Were the actual experiences of different institutions devoted to the study of radium to be quoted the truth of the above statement would be plain.

A few fragmentary contributions and reports have appeared, some of which are worthy of notice. From these it is again evident that the progress being made in the knowledge of radium efficiency in non-malignant surgical conditions and in certain nonsurgical affections of the upper air passages continues to be gratifying. This is shown by the work of various observers in the United States, particularly by that of Dr. Robert Abbe, of New York, and by the reports of the two leading British institutions, the Radium Institute of London and the Royal Infirmary of Edinburgh.¹

Thus the London Institute reports excellent results in the treatment of "vernal catarrh," patients treated for it by radium having in a large proportion of cases been cured without recurrence, although under observation for a series of years.

In the treatment of nævus by radium remarkable results are being obtained.² The most brilliant of these are seen in young children where conditions of unusual severity in the vicinity of the lips and nose, far beyond the limits of surgical relief, are being successfully reduced.

Rhinoscleroma, according to Kahler,³ has been treated with good effect. Good results have been obtained from the application of radium in goiter and in tubercular glands.⁴ For the latter Bissell,⁵ of New York, is particularly impressed with its value. Under his observation proper radium treatment has often and completely restored such glands to their normal functions. Abbe believes that leucoplakia of the tongue is not unlike a keratosis of the skin, often pre-cancerous and tending to extend downward and become cancerous. He considers that it is as capable of cure by radium as is the skin keratosis. Delavan⁶ has called attention to the same thing. Serra⁷ reports a successful case.

Much attention is also being given to the study of radium as applied to new growths in general and many highly interesting and important facts are being obtained. This is especially true of growths of a non-malignant character. In the treatment of nasopharyngeal fibroma the use of radium has proved encouraging, particularly so in view of its suc-

cess in the treatment of fibromata in other parts of the body.⁸ Abbe² has shown a case of myeloid tumor of the jaw, completely cured.

In the treatment of non-malignant intralaryngeal growths many highly interesting results have been obtained, tumors of various histological structures having disappeared, in a number of cases with complete restoration of the singing voice. The treatment of papilloma of the larynx by means of radium is one of the most interesting phases of its use. In view of the success already attained with it, as well as with warty growths in general, the outlook for it is most promising.

Weil⁹ reports a parotid tumor (adeno-cystic-epithelioma) of seven years' standing, which was treated for six weeks by the insertion of radium into it. The growth disappeared, and at the end of two years has not recurred. Freudenthal⁷ reports a case of fibrosarcoma of the right antrum cured. He also reports a case of sarcoma of the tonsil, in which the growth disappeared and remained in abeyance for six years. Then it recurred and the patient died. In another similar case the growth disappeared for six months.

In this highly specialized department, laryngology, radium promises to occupy a wide and important field.

While the treatment of these various lesions has been attended with interesting results, the final value of radium in certain of the more serious affections has yet to be proved. Especially is this true of its use in carcinoma, for while a considerable number of cases have been placed under treatment it has been claimed by some that the effect of radium has in certain instances been unsatisfactory; and even in some in which its influence has been temporarily beneficial the good effect has not always been lasting, or else too little time has elapsed to prove its final value. In a few cases it is said that not even temporary benefit has resulted, while in some of these the advance of the disease seems to have been hastened. Again, while parts of the region exposed have undoubtedly improved, other parts have retrogressed. Admitting that these several objections may contain more or less of truth it is, nevertheless, encouraging to know that the causes of more than one of them are understood and that diligent effort is being made to discover the means by which they may be prevented.

In this connection, recent British experience and opinion is interesting.

The report of the Radium Institute of London¹ states that "epithelioma of the buccal, lingual, and pharyngeal mucous membranes usually proves refractory and disappointing in its response to radium," but, it is significantly added, "*under new methods of application better results may be expected.*" Thus far, the treatment does not seem to have much effect in arresting the disease."

The report of the Royal Infirmary¹ gives a far more sanguine outlook. Thus: "While in advanced malignant cases a cure may not have been effected, yet in practically all treated more or less benefit was produced, through the relief of pain, the cessation of discharges, the healing of ulcerative surfaces, the removal of local growths, and the prolongation of life.

"Malignant disease of the posterior nares, buccal cavity, pharynx and larynx seems less amenable to radium, but this may be from the difficulty of administering a sufficient dose in such positions.

RADIUM

Several cases that have come under my own observation have shown effects worthy of notice. Two of them were epithelial carcinoma, originating in the left side of the throat close to the wall of the larynx and, as far as could be ascertained, extra-laryngeal. Both patients were men in the early fifties, hitherto in perfect health, active, vigorous, and of excellent antecedents. When first seen, the disease in both had invaded the interior of the larynx, the left lateral wall of the pharynx, the pyriform sinus, the tonsil, and the base of the tongue. In both, ulceration was present and there was marked aphonia and dysphagia. Operation was impossible. Both were subjected to the radium treatment at the same institution and large doses were applied. In both the results have been materially the same.

The first effect of the radium locally was an almost immediate control of the secretions of the throat. From having been abundant and fetid they promptly ceased. Following this the areas of ulceration rapidly diminished in extent, and in the less severe of the two cases they disappeared; while in the other case they seemed to do so, although it has not been possible to prove this, owing to the difficulty of examination. The swellings which had appeared over extensive areas of the affected parts decreased markedly, and the infiltrated tissues were reduced in size, became soft to the touch and more natural in appearance. Accompanying these changes extraordinary improvement took place in the various functions of the throat. Thus, the voice became clearer, and deglutition, which before the application of radium had become almost impossible, showed such improvement that both patients were able to swallow without pain and to largely increase the variety of their food.

Together with these local changes, the improvement in general was remarkable. Digestion became normal and sleep more prolonged and restful; while with the improved nutrition a steady increase of strength was apparent and a rapid return to an almost normal condition of good spirits. One of these patients, a physician, was able to resume his office practice and for two months remained steadily at work.

These patients, as well as all who have seen them, admit that even if from now on the progress of the disease should ultimately be unfavorable the benefit already gained in the relief of suffering and the added comfort afforded, would well repay them for any inconvenience the radium had caused. This is an important concession, for the superficial burn sometimes resulting from radium may be an unpleasant feature. Compared, however, with the results of any serious surgical operation, it is but a slight annoyance. And yet how gladly will the patient submit himself to the knife and to weeks and perhaps months of disability and suffering following its use for the sake of cure, quickly forgetting all the harrowing details of his surgical experience and even its resulting mutilations in the joy of being restored to life and health! Any method which will cure carcinoma, at the same time leaving the normal parts intact, with no worse penalty than a slight superficial burn, should surely be welcomed with acclaim.

The present is no time for the adverse criticism of radium. The study of the radium treatment of carcinoma is but just begun. Some, at the very threshold, are already discouraged, and are announcing themselves as unwilling to believe in its efficacy. To these we may repeat that the knowledge of the use of radium in general is still in embryo.

The failure to gain uniformly reliable results in carcinoma is

due to the imperfect knowledge of the methods by which the radiations can be controlled, of the amounts of radium which should be used, and of the correct duration of the exposures. The all-important basic principle has certainly been proved, namely that, under proper application, *radium will destroy a superficially located cancer cell*. Granting this proposition, it is by no means impossible that with increased knowledge of its action, and skill in its application, deeply seated cells may be successfully reached and destroyed, while at the same time the surrounding tissues are effectively protected.

Already, results worthy of profound consideration have been obtained. Far from being discouraged, there is every reason why persistent and continued effort should be made to finally solve the existing problems and give to the world a cure for one of its most grievous scourges. Fortunately, there are some who, in the face of many difficulties are earnestly and hopefully striving to obtain this end. Let such gain inspiration from Trudeau¹¹ that noblest of humanitarians: "Optimism is a mixture of faith and imagination, and from it springs the vision which leads one from the beaten paths, urges him to effort when obstacles block his way, and carries him finally to achievement when pessimism can only see failure ahead. Optimism may, and often does, point to a road that is hard to travel, or to one that leads nowhere; but pessimism leads to no road at all. * * * *

"Let us not therefore quench the faith nor turn from the vision which, whether we own it or not, we carry * * * * and thus inspired many will reach the goal," as have all whose hopeful imaginings and courageous efforts have been the basis of every noble success the world has ever seen.

REFERENCES.

1. *British Med. Journal*, June, 1915.
2. Abbe: Oral communications, 1916.
3. *Wiener klin. Woch.*, 1905.
4. *Journal-Lancet*, 1915.
5. J. B. Bissell: Oral Communication, 1916.
6. *Trans. Amer. Laryngolog. Assn.*, 1915.
7. *Revista Espan. de Urol. y Dermatol.*, August, 1915; *Laryngoscope*, April, 1916.
8. Delavan: *MEDICAL RECORD*, June 18, 1915.
9. *Journal Amer. Med. Assn.*, December 18, 1915.
10. *N. Y. Med. Journal*, July 3, 1915.
11. President's Address, Eighth Congress of American Phys. and Surgs., Washington, 1910.

REVIEWS AND ABSTRACTS.

Henry Schmitz, M.D., F. A. C. S., (Chicago). The Action of Gamma Rays of Radium on Deep-seated Inoperable Cancers of the Pelvis. *Medical Record*, XC, 100-105, July 15, 1916. This article covers in part the same ground as in Dr. Schmitz' article, "An Additional Contribution to the Therapeutic Value of Radium in Pelvic Cancers," which appeared in the August, 1916, number of *Surgery, Gynecology and Obstetrics*.

RADIUM

"THE HISTOLOGICAL FINDINGS.—The histological changes may be divided into four stages:

"The first stage is characterized by an enlargement of the carcinoma cells, a hyperchromatosis and a pycnosis of the nuclei. They are evident in all the cases examined. These changes usually occur within about ten days after the first application of radium.

"In the second stage we observe caryolysis, caryorrhexis, cytolysis, and cell detritus. They are seen as early as from the first to the third week of the treatment.

"The third stage shows an absorption of the cellular and nuclear debris by phagocytosis. Macrophages and microphages are concerned in this step. It takes place as soon as the cells begin to degenerate.

"The fourth stage is the stage of connective-tissue proliferation and scar formation. It completes the histological cure of cancer. The places left vacant by the dead carcinoma cells are immediately filled by young fibroblasts derived from the connective-tissue stroma of the tumor. The fibroblasts become differentiated. The fourth stage appears usually after the first to the third month, but may occur much sooner.

"A discrepancy frequently exists between the clinical results and the histological findings. For instance, in case 26 of our series there was evidence of a completely destroyed cancer tumor, yet the patient succumbed to a bowel invasion, proving that some cancer cells either remained uninfluenced by the radium or regenerated after the subsidence of the action of the rays. Therefore, certain questions arise which call for definite answers before we may positively state that radium rays cause a degeneration and ultimate death of cancer tissue and a simultaneous proliferation of connective tissue.

"1. Are we able by microscopic examinations to differentiate the necrobiotic changes in the carcinoma cells brought about by natural and artificial conditions from those caused by the influence of radium rays? Cells under necrobiotic changes in the course of their existence. Heat caustics, and alcohol, brought in contact with the tissues, may produce the same changes, as is well known. However, the absence of cell degeneration as evidenced in the first section, and the general and extensive changes as seen in the subsequent specimens after their exposure to the gamma-rays, and the regularity of their occurrence in all the tissues microscopically investigated, even in those not previously cauterized, permit us to state that they must be caused by the action of the gamma-rays.

"2. Can we, by examination of small pieces of tissue removed from the growth, determine the extent and intensity of the action of radium rays? We cannot from such an examination, but could do so from serial sections from all the organs removed either *intra vitam* during operation or, preferably, *post mortem*.

"I have, fortunately, seven cases in which an abdominal panhysterectomy was performed after a clinical cure of the cancer by the use of radium rays was obtained. (Cases 26, 29, 32, 64, 128, 162 and 165.) Serial sections were made from the tissues removed. A microscopic examination revealed that the cytolytic changes were generally present throughout the tumor. This does not prove that distantly located foci were not left behind. As a matter of fact, patients 26 and 29 died subsequently from cancer. This shows that viable cancer cells were left

behind somewhere in the pelvis. Bumm examined tissues acted on by gamma-rays and removed afterwards during post mortem examinations. He estimated that the intensity of the gamma-rays sufficient to destroy carcinoma tissue extended into a radius of four centimeters. Within this area of intensity, carcinoma cells were not found present. Beyond it, however, typical unchanged cancer cell nests were still found to exist. In other words, extensive carcinoma growths are only partially destroyed by gamma-rays. This area of destruction, however, has a diameter of eight centimeters and enables us to reach tissues which a knife could never remove.

"3. Is it possible by such microscopic examinations to state whether a carcinoma cell has perished or whether it might not regenerate after the action of the radium ceases? The following citation will illustrate the answer to this question. Cheron and Rubens-Duval treated a patient suffering from an inoperable carcinoma of the cervix with radium during November, 1910, and January, 1911. The patient was apparently cured. She died from an intercurrent disease (a cerebral softening) during April, 1912, fifteen months after the beginning of the radium treatment. All the internal organs and tissues were removed post mortem, and a careful serial histological examination of all the tissues did not reveal a single carcinoma cell at any place of the organism. A complete anatomical cure by radium rays had been demonstrated.

"I have made a similar observation in a case of Mrs. A. R., Augustana Hospital, number 44801, serial number 141, who was treated with 3,600 milligram-hours radium element from October 27 to October 31, 1915, for an inoperable cancer involving the cervix and the entire vagina. An examination made December 27, proved the patient clinically cured. She died suddenly during the latter part of January, 1916, from heart-block. The pelvic organs with the para and perimetrium and parietal peritoneum and lymphnodes, including the sacral, were removed en bloc. A most careful examination of stained sections in series did not reveal any cancer cells or nodules.

"Our investigations demonstrate the uniformity and general extent of the necrobiotic changes brought about in the carcinoma cells by the action of the gamma-rays. Bumm's researches fix the extent of the area within which a carcinoma will become destroyed, and Cheron and Rubens-Duval's case proves the capability or efficiency of the radium rays to bring about an anatomic cure of cancer."

* * * * *

Russell H. Boggs, M. D., (Pittsburgh). The Treatment of Epithelioma of the Lower Lip. Interstate Medical Journal, Vol. XXIII, No. 5, 1916. Epithelioma of the lower lip, however innocent in appearance, is nevertheless cancer, and often shows a degree of malignancy that is not usual in epithelioma in other situations. It seems to be rather a regional than a local lesion. The lymphatics which drain it should in every case receive the same attention as the visible lesion. Until recently the best routine treatment has been early surgical removal of the ulcer and lymphatics. Until the introduction of the roentgen rays and radium there was no alternative treatment. Severe caustics would occasionally destroy the growth, but the resulting scar was large and retracted and the percentage of recurrence was very high. Even after clean-cut operation, results were sufficiently bad to lead the more careful surgeons to refer

RADIUM

these cases for post-operative radiotherapy as a prophylactic against recurrence from lymphatic trunks that had been overlooked. Today the general practitioner frequently refers these cases to the roentgenologist in the first instance rather than to the surgeon.

To the mind of some, the open question is whether they are justified in referring these cases for radiotherapy. In deciding this question let us consider the circumstances under which we have won our present position. In the quite recent past, the radio-therapist was necessarily untaught and inexperienced, for he was a pioneer. His supply of radium was insufficient, and his apparatus unstable. He was *compelled* to adopt the fractional dose instead of the massive single dose, universally regarded as superior by men of experience with both. Even with the fractional dose he was guided by the possibilities of his apparatus rather than by his opinion as to the amount of radiation necessary. In other words, he concerned himself rather with technique than with the principles of therapeutics. He was limited to the worst possible class of cases,—namely, those for which surgery had done its best or worst. Under these circumstances it is no wonder that we all saw cases said to have had innumerable roentgen exposures without the slightest sign of reaction, that we saw roentgen ulcers treated in place of an epithelioma, which had long been cured, and that we saw epitheliomas stimulated to more rapid growth and metastasis rather than improvement by the ray. Yet even so, radiotherapy demonstrated its superiority by not infrequent cures of recurrent or otherwise inoperable cases.

How different is the picture today. With radium, the powerful transformer and the Coolidge tube, the therapist administers with precision the single massive dose that his experience tells him is necessary. He concerns himself not only with technique, but also with the type of lesion and with the individual. He sees early cases in which a diagnosis is yet questionable; he sees cases a trifle more advanced after radical operation, in which he administers prophylactic radiation, as well as in hopelessly inoperable cases. He not only sees more cases in a year than any individual surgeon of equal standing and reputation, but he works earnestly over many cases long after they have been abandoned by family physician, dermatologist and surgeon. He is in the best possible position to compare different methods of treatment from the standpoint of ultimate results. In short, he has a broader clinical knowledge of the subject than any other man. Should he, therefore, still be relegated to the position he quite properly occupied ten years ago as an adjunct to the surgeon?

It is quite frequently said at medical meetings that every cancer is curable at some stage by operative removal. This is perhaps a tactful thing for the roentgenologist to say. It pleases the surgeon and induces an agreeable mood of reciprocation. The only objection to this statement is that from the practical standpoint it is not true. If there is such a stage it is one that escapes the notice not only of the physician but of the patient himself. The untimely death from cancer of the tongue of one of the ablest of the present generation of Pittsburgh physicians is sufficient evidence of this. But, if further support is needed, I could quote figures collected by Murphy, and published in his clinics, showing that of the most favorable class of cases (those submitted to radical operation when there was as yet no evidence of glandular involvement) 52 per cent. died, finally, a cancer death.

Guided by these considerations, the writer believes radiotherapy, by

means of radium and the modern roentgen tube, at present constitutes the best routine treatment of epithelioma, both at the early and late stage. Experience leads me to take a firm conviction that whatever position you may take today you will all ultimately agree with me in this respect.

There has been much haggling surgery of lip cancers; and it is hoped that this paper may not encourage haggling radiotherapy in the same field. The inexperienced, with recklessness solidly founded on ignorance, may burn a case; but he is scarcely more dangerous than the slightly experienced and over-cautious radiotherapist giving insufficient dosage which may stimulate the growth exactly in the same degree as an incomplete operation.

Epithelioma of the lower lip was discussed before the American Dermatological Society, many taking part, and it was concluded that epithelioma of the lower lip could be successfully treated by radiotherapy provided the cases were selected by an expert, and the operator was qualified. All agreed it was a perfectly legitimate method of treatment, but that it was a method liable to abuse if it were not restricted to its proper field. We all know that lately many have been purchasing x-ray machines and radium tubes, and are giving all kinds of treatment without much knowledge of the subject. The six or eight weeks' course of instructions will teach many, so that they can make a few good plates. But their interpretation in terms of radiotherapy is another proposition.

That radiation, applied by a trained and skillful radio-therapist, will destroy epitheliomatous tissue has been definitely proved, and in cases of epithelioma, far advanced, it is the only weapon at hand for science. Miraculous as are its results in some recent cases, it cannot be expected to compensate for neglect of prophylactic treatment; precancerous changes, so well recognized clinically, must be regarded seriously, and in cases in which excision is advisable, radiation comes almost as an indispensable adjunct. Anyone who does not realize that he is treating a serious condition is not competent to carry out any method of treatment of epithelioma of the lower lip. Beside, he should have had experience before he assumes the responsibility by himself.

The technique, whether using radium or the roentgen rays, must be varied somewhat for the individual case. Scientific dosage should be regarded from two points of view—that of physics and that of therapeutics. Physical dosage may be fairly exact. Therapeutic dosage cannot be indicated with the same certainty. It not only depends on experience gained with a certain technique, but it also proceeds from a knowledge of the clinical character of the epithelioma and of the susceptibility of the patient. I prefer to use radium locally in epithelioma of the lower lip and ray the adjacent glands with a Coolidge tube. When using radium, a capsule is placed inside, one on top, and another on the outside of the lip. By so doing the whole area is thoroughly radiated. One advantage of radium is that it produces a more intense reaction which disappears much more rapidly than a reaction of the same degree produced by the roentgen rays. Usually the first reaction is sufficient to heal a lesion of moderate extent. The resulting scar must be healthy, pliable, without any retraction and without scaliness before a case is considered clinically cured. The treatment of the adjacent glands is most important and should never be omitted, no matter how small the lesion. Partial removal of an epithelioma is to be condemned.

In an article, "The Local Application of Radium, Supplemented by Roentgen Therapy," which I read before the American Roentgen Ray

RADIUM

Society, September, 1915, I explained in detail the value of the combined use of radium and the roentgen rays, which is applicable in the treatment of epithelioma of the lower lip.

Any method in the treatment of epithelioma must be one which completely eradicates every cancerous cell. Experience has taught us that an epithelioma in this situation is rather a regional than a local lesion. For this reason early surgical removal, wide and radical, has proved inefficient, because a recurrence takes place in over 50 per cent. of the cases, when there are no palpable glands at the time of operation, and in over 75 per cent. when there is any glandular involvement. All precancerous lesions should be removed by some method without leaving any scar whatever. Many believe the results by radiotherapy (meaning radium and the roentgen rays) are equal and even better than those by surgery, and that the removal should only be done in selected cases. There are a number of radio-therapists who have had sufficient experience in epithelioma of the lower lip whose results justify them in considering radiotherapy a perfectly legitimate method of treatment.

* * * * *

George Erety Shoemaker, M.D., F.A.C.S., (Philadelphia). *Primary Carcinoma of the Urethra, Retention of Urine from Obstruction, Restoration of Function by Radium. Surgery, Gynecology and Obstetrics XXII, No. 6, pp. 730-731, June, 1916.* "The occurrence of primary carcinoma of the urethra is so rare that all cases should be reported, and especially the influence which radium may exert on their relief is of interest."

"L. S. McMurtry, after a search of the scanty literature, calls the urethra the 'rarest location' for primary carcinoma. Many cases reported are merely extensions from other commoner localities and will not bear analysis."

"Bringing previous searches down to date, he was able in his paper before the American Surgical Association, to find but 26 cases, beginning with one reported by Madame Boivan in 1828."

"F. von Winkel, says that such carcinomatous neoplasms are of extremely rare occurrence, and those reported have usually spread from the external genitalia or the vagina. He saw two primary cases and says that in both a pavement epithelioma had undoubtedly started in the urethral mucosa. The second patient had urethral and vesical calculi and died of uraemia. He refers to four cases published by Melchiori and one by Roberi in 1869. Their observations were that periurethral cancer appeared as nodules in the vestibule and extended thence in the cellular tissues along the urethra, without, however, affecting the walls or the mucous membrane of the canal, the nodules being at first hard, painless and non-ulcerating. In the earlier stage, they do not extend to the depth of more than half the length of the urethra; in the second stage, they reach the pelvic fascia and the neck of the bladder.

"Sielman mentions one case of carcinoma of the urethra as being considerably reduced in size, with relief of the accompanying dysuria, by application of X-rays. An interesting example of what radium may accomplish is reported by Legueu and Cheron of Paris."

"A woman aged 26; pavement epithelioma; at first involving the urethra, which was destroyed producing incontinence; extension to

vagina. Radium applications by Cheron with disappearance of growth. Two and a half years later, death under operation for implantation of ureters in bowel. Autopsy; no microscopical malignancy."

"The writer would record his only experience as follows, all others seen being instances of involvement by extension."

"Mrs. W., multipara, a full blood Virginia negress, aged 50 years, applied at the Presbyterian Hospital because of overdistention of the urinary bladder with complete retention. Beginning about five months before (July, 1915), there had been some difficulty in urination gradually succeeded by dribbling. For more than a week bladder distention had been extreme, and on admission culminated in inability to pass any urine at all. There had been no bleeding or pain, except that due to the bladder condition."

"No ordinary sized catheter could be introduced, owing to a nodular infiltration in and around the urethral canal. The urethra felt through the vagina like a hard fixed ridge of the size of a lead pencil, extending from the meatus back nearly to the base of the bladder. The orifice was retracted, its edges hard, irregular, nodular and ridge-like. The vaginal surfaces were normal in color—the surfaces of the urethral mucous membrane were reddish but not ulcerating. There was no involvement of the cervix or uterus; the vagina and the vestibule showing only senile changes, except close to the urethral canal. There was no tumor. A No. 6 ureteral catheter was passed with some difficulty. It was tied in and the bladder thus gradually drained. In the first 24 hours 173 ounces or nearly 11 pints of urine were thus obtained and some was lost."

"Bladder drainage and rest in bed caused sufficient subsidence of swelling to enable a No. 12 soft catheter to be passed after some days, but retention persisted."

"Surgery was inadvisable as the removal of the entire urethra up to the neck of the bladder would have been necessary, with resulting incontinence. Radium was therefore advised. Dr. William S. Newcomet carried out this portion of the treatment, while the bladder paralysis and cystitis resulting from overdistention were being treated in the writer's service at the Presbyterian Hospital."

"The patient was transported to and fro, from time to time, to the Department for Radiotherapy of the Jefferson Hospital, where an applicator of proper size and efficiency was to be found. Between December 14, 1915 and January 4, 1916, nine applications in all were made, of three hours each. The quantity used was 20 milligrams of radium element."

"The first few drops of urine were spontaneously passed December 24. The quantity gradually increased until by January 15 the bladder was completely emptied by the patient in a normal manner. There was no leakage, no pain, and no bleeding. A No. 19 flexible catheter could now be passed."

"The urethra still retained its pencil-like feel. There was a short split in the lower portion of the meatus, doubtless due to traumatism of the rigid tissue. The radium produced a pallor of the mucous membrane both about the urethra and in the vaginal entrance, a form of radium burn, but there had been no loss of substance or ulceration."

"A small piece was afterwards removed at the edge of the meatus and examined in the laboratory of the Presbyterian Hospital by Dr. Damon B. Pfeiffer, pathologist."

RADIUM

"Microscopical report: Squamous celled carcinoma."

"The Wassermann test for syphilis was negative, and there was no specific history."

"The inguinal lymphatics were not enlarged, but when their removal was advocated, the patient disappeared, considering herself well."

* * * * *

J. Wesley Bovee, M. D. (Washington). Notes on the Past, Present, and Future of Gynecology, Obstetrics, and Abdominal Surgery. Surgery, Gynecology and Obstetrics, XXIII, No. 3, pp. 290-6, Sept. 1916.

"The treatment of cancer of the uterine cervix continues to receive the very earnest attention of gynecologists, and special activity in the general subject of cancer during the past three years has been enthusiastically aided by this society. Thus far the cause of cancer has not been found and no doubt this must be discovered before we may reasonably expect to gain a mastery over this dreadful disease. Its behavior, as influenced by radium and long-continued, slightly elevated temperature, as advocated by Percy, is of interest. The use of certain rays from radium seems to retard its progress and, perhaps, completely destroys it while other rays from it are thought to induce the disease. If the latter be a fact we may well refuse to believe, for the present, that cancer is of microbic nature. Even the Percy method emphasizes this doubt for it should stimulate microbic activity; yet its retarding influence on the progress of cancer of the cervix is attested by many careful and reliable observers. But neither of these two agents can be regarded as a specific for this disease for they are both notably limited in their radius of action. Whether radium has deeper penetrating power as a cancer destroyer than the Percy heating method is a matter of doubt and the cases reported by Boldt throw grave doubt on the penetrating power of Percy's method used for this purpose. This latter method is based upon the application of a low elevation of heat to the involved tissues. And yet for this purpose is employed an instrument so hot that it has constantly to be moved to prevent overheating and the heat is gauged principally by the sense of touch through the uterine wall, which varies greatly in individuals. If this method is proved a specific against the active agent of cancer, is it not to be the sole agency in the treatment and cure of cancer in the breast, bladder, vagina, vulva, and rectum? If it has a positive specificity for two inches then no part of the human body will be inaccessible to its beneficent influence."

"It would appear then, that our hope in cancer of the uterus continues to consist of surgery, as early as possible, universal education on this subject, the employment of radium and high or higher temperatures and unremitting search for the true etiology of it. Radium offers benefit to other forms of neoplasms, particularly to the bleeding uterine fibroid, according to several credible observers. Nevertheless it is yet but an empiric agent, not available to more than a very small percentage of patients suffering from the many conditions in which it is extolled and not without its evil effects, such as corrosion of tissue. While we may believe enthusiastic faith has had much, far too much, to do with the reported results of radium application, we cannot fail to recognize that this agency, when properly harnessed, has great possibilities in the treatment of pathological conditions. I believe it is deserving of being absolutely divorced from charlatanary and commercialism. Its exploitation has been unfortunate."

STANDARD CHEMICAL COMPANY

PITTSBURGH, PA.



Reduction Mill of Standard Chemical Co., Canonsburg, Pa.

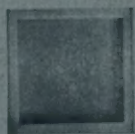
Miners of Uranium and
Vanadium Ores, and Producers
of Radium

STANDARD CHEMICAL COMPANY

RADIUM

STANDARD CHEMICAL CO.

*U. S. Bureau of Standards
Measurement*



*Type "A"
Dermatological
Applicator*



*Type "B"
Universal
Applicator*

*Radium Element Content and
Delivery Date Guaranteed.*

**RADIUM CHEMICAL
COMPANY**

PITTSBURGH, PA., U. S. A.